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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,738	03/04/2004	Kyungseok Cho	032758-6	5320
22204	7590	09/09/2005	EXAMINER	
NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128			EDGAR, RICHARD A	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/791,738

Applicant(s)

CHO ET AL.

Examiner

Richard Edgar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004 under 37 C.F.R. §1.53(b).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/4/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings are objected to because:

The drawing sheet numbering must be clear and larger than the numbers used as reference characters. See 37 C.F.R. § 1.84(t).

The view numbers must be preceded by the abbreviation "FIG." See 37 C.F.R. § 1.84(u)(1).

The view numbers must be larger than the numbers used for reference characters. See 37 C.F.R. § 1.84(u)(2).

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: σ_r [0037], cr1 and cr2.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

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prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

In paragraph [0008], line 2, "ration" appears to be a misspelling and should be -- ratio--.

In paragraph [0013], line 15, paragraph [0014], line 21, paragraph [0030], line 10, and paragraph [0040], line 9, "into" should be -- by -- since the difference should be divided by the ratio and not into the ratio.

In paragraphs [0046] and [0048], line 3, "divided by 17" appears to be a word processing error.

The specification uses symbols through the detailed description apparently commensurate with the symbols used in the graphs ($\square \diamond \blacksquare \Delta \bullet$), however, most of the different symbols appear as a hollow box (\square).

Appropriate correction is required.

Claim Objections

Claims 1 and 7 are objected to because of the following informalities:

The claims define the percentage of camber ratio decrease by dividing the camber ratio difference into the root camber ratio, however, the percentage decrease in camber ratio should be defined as dividing the camber ratio difference by the root camber ratio. Appropriate correction is required.

Claims 4 and 10 are objected to because of the following informalities:

The claims require the root camber ratio to be 0.1 and the tip camber ratio to be 0.01, which yields a camber ratio decrease of 90%, which is outside the claimed range. Instead, it appears the claims should recite a 0.1 root camber ratio or a 0.01 tip camber ratio.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4-6 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 5,312,230 (Oda et al. hereinafter).

Oda et al. show an axial-flow fan 12 comprising: central hub 14 connected with a driving shaft 16 of a motor 12; and plurality blades 18 extending radially along the axial direction, the plurality of blades integrated with the hub into a single body (col. 3, lines 4-6), wherein the percentage of decrease of the camber ratio between the root and tip is in a range between 37.5% (12% root camber ratio and 3% tip camber ratio) and 75% (8% root camber ratio and 5% tip camber ratio). See column 5, lines 56-63.

Oda et al. teach in Fig. 6 that the camber ratio at the root of the blade is smaller than 10% (lines C, D and E) and is smaller than 6.5% (line E), while the camber ratio at the tip is greater than .025 (lines A-E).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,312,230 (Oda et al. hereinafter) as applied to claim 1 above, and further in view of United States Patent No. 6,027,307 (Cho et al. hereinafter).

Oda et al. teach a fan impeller having a plurality of blades, as explained above with respect to claims 1 and 7, however, Oda et al. do not teach a setting angle of each

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blade increasing from an intermediate region of each blade to the blade tip, wherein the degree increase is between 2 and 8 degrees.

Cho et al. disclose in Fig. 8, an axial fan having a setting angle which preferably varies from 18-22 degrees, increasing from an intermediate region of each blade to the blade tip (see col. 3, lines 32-36) for the purpose of maximizing impeller efficiency.

Since Oda et al. show an axial fan having blades designed to maximize impeller efficiency, and Cho et al. teach that the blade setting angle should increase a small degree from the intermediate region of each blade to the blade tip to maximize the impeller efficiency, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the Oda et al. setting angle from the intermediate region to the blade tip increase a small degree, as taught by Cho et al. for the purpose of maximizing the impeller efficiency.

Claims 7 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,312,230 (Oda et al. hereinafter) as applied to claims 1 and 4-6 above, respectively, and further in view of United States Patent Application Publication No. 2003/0012656 A1 (the '656 reference hereinafter).

Oda et al. teach all of the claimed limitations as explained in the 35 U.S.C. § 102 section above, except for each blade having a backward sweep angle at the blade root thereof and a forward sweep angle at the blade tip thereof, while having an airflow distributing region that is defined by a plurality of small regions where sweep angles are

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changed in turn formed on a region between the backward sweep angle region and the forward seep angle region.

The '656 reference teaches an axial fan having a plurality of blades 14 wherein each blade has a backward sweep angle at the blade root 14a thereof and a forward sweep angle at the blade tip thereof 14b, while having an airflow distributing region that is defined by a plurality of small regions (inflection points: IP1-IP3; see Fig. 1D) where sweep angles are changed in turn formed on a region between the backward sweep angle region and the forward seep angle region for the purpose of reducing impeller noise and increasing impeller efficiency.

Since the Oda et al. reference teaches to increase the impeller efficiency and the '656 reference shows to design the blades to have a specific geometry to reduce the impeller noise and increase the impeller efficiency, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the geometry of the Oda et al. blades so that each blade is backward swept at the blade root and forward swept at the blade tip, while having an airflow distribution region that is defined by a plurality of small regions where sweep angles are changed in turn formed on a region between the backward swept angle region and the forward swept angle region, as taught by the '656 reference, for the purpose of reducing impeller noise and increasing impeller efficiency.

A translation of the Korean 2003-0013767 priority document may be required if Applicants attempt to disqualify the '656 reference under 35 U.S.C. § 103(c). Note, that

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an invention is "by another" if not all of the inventors are the same. See MPEP § 2136.04.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,312,230 (Oda et al. hereinafter) in view of United States Patent Application Publication No. 2003/0012656 A1 (the '656 reference hereinafter) as applied to claim 7 above, and further in view of United States Patent No. 6,027,307 (Cho et al. hereinafter).

Oda et al. teach a fan impeller having a plurality of blades, as explained above with respect to claims 1 and 7, however, Oda et al. do not teach a setting angle of each blade increasing from an intermediate region of each blade to the blade tip, wherein the degree increase is between 2 and 8 degrees.

Cho et al. disclose in Fig. 8, an axial fan having a setting angle which preferably varies from 18-22 degrees, increasing from an intermediate region of each blade to the blade tip (see col. 3, lines 32-36) for the purpose of maximizing impeller efficiency.

Since Oda et al. show an axial fan having blades designed to maximize impeller efficiency, and Cho et al. teach that the blade setting angle should increase a small degree from the intermediate region of each blade to the blade tip to maximize the impeller efficiency, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the Oda et al. setting angle from the intermediate region to the blade tip increase a small degree, as taught by Cho et al. for the purpose of maximizing the impeller efficiency.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (571) 272-4816. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7 am- 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Edgar
Examiner
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RE